### (19) World Intellectual Property Organization

International Bureau



## 

(43) International Publication Date 27 January 2005 (27.01.2005)

**PCT** 

# (10) International Publication Number WO 2005/007900 A1

(51) International Patent Classification?: 3/04, 3/12, 3/44, 19/00, 3/14

C22B 3/00,

(21) International Application Number:

PCT/AU2004/000939

(22) International Filing Date:

12 July 2004 (12.07.2004)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data: 2003903741

18 July 2003 (18.07.2003) AU

(71) Applicant (for all designated States except US): ZINIFEX LIMITED [AU/AU]; Level 15, Royal Domain Centre, 380 St Kilda Road, MELBOURNE, Victoria 3004 (AU).

(72) Inventors; and

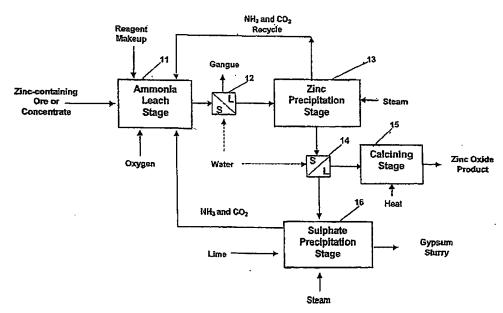
(75) Inventors/Applicants (for US only): FREEMAN,
Paul Christopher [AU/AU]; 15 Grey-Smith Gardens,
WOODVALE, Western Australia 6026 (AU). BRYANT,
Sally Elizabeth [AU/AU]; 5B Melaleuca Court, ROXBY
DOWNS, South Australia 5725 (AU). NEWMAN,

Oliver Michael Griffiths [AU/AU]; 7 Glenurie Close, WOODVILLE, New South Wales 2321 (AU).

- (74) Agent: GRIFFITH HACK; 509 St Kilda Road, MEL-BOURNE, Victoria 3004 (AU).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: A PROCESS FOR UPGRADING AN ORE OR CONCENTRATE



(57) Abstract: According to the present invention there is provided a process for upgrading an ore or concentrate that contains metal sulphur minerals and gangue material. The process includes the stages of: a) selectively leaching the ore or concentrate using an ammoniacal solution containing ammonium carbonate that forms soluble metal ammine complexes; b) separating the solid and liquid phases formed in stage a) with the liquid phase forming a solution including soluble metal ammine complexes and the solid phase including at least in part the gangue material; c) removing ammonia and carbon dioxide from the liquid phase formed in step b) under conditions so as to selectively precipitate the valuable metal(s); and d) separating the solid and liquid phases formed in stage c) with the solid phase forming a more-concentrated source of valuable metal

07900 A1

## WO 2005/007900 A1



#### Published:

with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.